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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/713,247	11/16/2000	Takayuki Toshima	199764US3	3215

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EXAMINER

LUND, JEFFRIE ROBERT

ART UNIT PAPER NUMBER

1763

DATE MAILED: 07/21/2003

11

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Applicati n No.

09/713,247

Applicant(s)

TOSHIMA ET AL.

Examin r

Jeffrie R. Lund

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☒ This action is FINAL. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 18-37 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 18-37 is/are rejected.
- 7) ☒ Claim(s) 18-27 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☒ The proposed drawing correction filed on 30 January 2003 is: a) ☒ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) ____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Claim Objections

1. Claims 18- 27 are objected to because of the following informalities: in claim 18 line 19 "record temperature" should read --second temperature--. Appropriate correction is required.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 18, 19, 21, 22, 28, 29, 31, and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sakai, US Patent 6,409,838, in view of Hunter et al, US Patent 6,151,446.

Sakai teaches an apparatus that includes: a process chamber 21a, a heating plate 51 for heating a substrate W, a bubbler 27 for supplying a vapor into the chamber via a ring 58 surrounding the substrate to treat the upper surface of the substrate, an exhaust system, and lift pins 56 for holding the substrate. The lift pins move through holes in the heating plate, the substrate is in contact with the heater in the lower position, and gas flows horizontally to the substrate. (Figures 5 and 7, and column 6 lines 13-65)

Sakai differs from the present invention in that Sakai does not teach: a driving and controlling section configured to drive and control the substrate holder, and cause

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the substrate holder to keep the substrate at three or more height positions relative to the hotplate, including at least an upper position where the substrate is loaded/unloaded to/from the substrate holder, a middle position where the substrate is maintained at rest to be pre-heated at a first temperature and a lower position where the substrate is maintained at rest to be heated to a second temperature higher than the first temperature; or supplying a silylation agent to perform a silylation treatment.

Hunter et al teaches a thermal processing apparatus that includes a driving and controlling section configured to drive and control the substrate holder, and cause the substrate holder 36 to keep the substrate at three or more height positions relative to the hotplate, including at least an upper position where the substrate is loaded/unloaded to/from the substrate holder, a middle position where the substrate is maintained at rest to be pre-heated at a first temperature and a lower position where the substrate is maintained at rest to be heated to a second temperature higher than the first temperature. (Column 3 line 56 through column 4 line 4)

The motivation for controlling the lift pins of the holder in the apparatus of Sakai as taught by Hunter et al is to avoid problems that might result from the rapid increase in temperature caused by contact of the substrate with the heater.

Silylation treatment on a surface of a resist film is well known in the art. It would be obvious to supply the apparatus of Sakai and Hunter et al the required silylation reagent and to operate the apparatus at the proper temperatures to perform the silylation treatment. Furthermore, it has been held that: claims directed to apparatus must be distinguished from the prior art in terms of structure rather than function. *In re*

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Danley, 120 USPQ 528, 531, (CCPQ 1959); "Apparatus claims cover what a device is, not what a device does" (Emphasis in original) *Hewlett-Packard Co. V. Bausch & Lomb Inc.*, 15 USPQ2d 1525, 1528 (Fed. Cir. 1990); and a claim containing a "recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus " if the prior art apparatus teaches all the structural limitations of the claim *Ex parte Masham*, 2 USPQ2d 1647 (Bd. Pat. App. & Inter. 1987). Also see MPEP 2114. The apparatus of Sakai and Hunter et al teaches all the structural limitations of the claimed invention.

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to control the movements of the lift pins of the holder of Sakai as taught by Hunter et al, and it would be *prima facie obvious* to one of ordinary skill in the art at the time the invention was made to supply the required silylation reagent and to perform a silylation process in the apparatus of Sakai and Hunter et al.

4. Claims 20 and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sakai and Hunter et al as applied to claims 18, 19, 21, 22, 28, 29, 31, and 32 above, and further in view of van de Ven et al, 5,620,525.

Sakai and Hunter et al differ from the present invention in that they do not teach supplying an inert gas to a non-treatment surface of the substrate via holes for the lift pins.

Van de Ven et al teaches supplying an inert gas to the backside (non-treatment) surface of the substrate via holes for the lift pins to prevent deposition on the non-

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treatment surface of the substrate. (Figure 6, column 7 lines 31-67, specifically lines 64-67)

The motivation for supplying an inert gas to the non-treatment surface of the substrate via the lift pin holes of Sakai and Hunter et al as taught by van de Ven et al is to prevent deposition of materials on or contact of processing gases with the non-treatment surface of the substrate.

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to supply an inert gas to the non-treatment surface of Sakai and Hunter et al as taught by van de Ven et al.

5. Claims 23 and 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sakai and Hunter et al as applied to claims 18, 19, 21, 22, 28, 29, 31, and 32 above, and further in view of Maeda et al, US Patent 5,620,523.

Sakai and Hunter et al differ from the present invention in that they do not teach that the ring has a plurality of supply holes on an inner circumferential surface of a ring member.

Maeda et al teaches a gas supply ring 9a with a plurality of supply holes 22 on an inner circumferential surface. (Figures 6A, 6B, 7A, 7B, 8A, 8B, 9A, 9B)

The motivation for replacing the open gas supply ring of Sakai and Hunter et al with the gas supply ring having an inner circumferential surface with a plurality of holes is to provide a gas supply ring that provides a better distribution of gas across the substrate to improve the uniformity of the coating on the substrate.

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Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to replace the gas ring of Sakai and Hunter et al with the gas ring of Maeda et al.

6. Claims 23-27 and 33-37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sakai and Hunter et al as applied to claims 18, 19, 21, 22, 28, 29, 31, and 32 above, and further in view of Kwag et al, US Patnet 6,402,849 B2.

Sakai and Hunter et al differ from the present invention in that they do not teach that the ring has a plurality of supply holes arranged in a vertical direction on an inner circumferential surface of a ring member in which the diameter of the upper holes are larger than the lower holes, and half the holes are gas supply holes and the other half, opposite the first have are exhaust holes.

Kwag et al teaches a gas supply ring with a plurality of supply holes 150 disposed in a vertical direction on an inner circumferential surface, the supply holes 150 are arranged in half the ring, and exhaust holes 180 are arranged in half the ring opposite the inlet half of the ring. (Entire document)

The motivation for replacing the open gas supply ring of Sakai and Hunter et al with the gas supply ring having an inner circumferential surface with a plurality of holes arranged in a vertical direction on an inner circumferential surface of a ring member, and half the holes are gas supply holes and the other half, opposite the first half have are exhaust holes is to provide a gas supply ring that provides a better distribution of gas across the substrate and improves the flow pattern in the chamber (i.e. laterally

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across the wafer), both of which improve the uniformity of the coating deposited on the substrate as taught by Kwag et al.

The motivation for selecting a specific size of holes is to optimize the flow pattern in the processing chamber.

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to replace the gas ring of Sakai and Hunter et al with the gas ring of Kwag et al, and it would be *prima facie obvious* to one of ordinary skill in the art at the time the invention was made to optimize the size of the holes to optimize the flow of the gas in the chamber.

Response to Arguments

7. Applicant's arguments with respect to claims 18-37 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

8. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any


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extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jeffrie R. Lund whose telephone number is (703) 308-1796. The examiner can normally be reached on Monday-Thursday (6:30 am-6:00pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory Mills can be reached on (703) 308-1633. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9310 for regular communications and (703) 872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.


Jeffrie R. Lund
Primary Examiner
Art Unit 1763

JRL
July 17, 2003